

vessels where the surrounding bulkheads and decks are of an insulating material such as fiberglass or wood.

§ 169.679 Wiring for power and lighting circuits.

Wiring for each power and lighting circuit must meet subpart 111.60 of this chapter.

§ 169.680 Installation of wiring for power and lighting circuits.

(a) Wiring must be run as high as practicable above the bilges.

(b) Each cable installed where particularly susceptible to damage such as locations in way of doors, hatches, etc., must be protected by removable metal coverings, angle irons, pipe, or other equivalent means. All metallic coverings must be electrically continuous and grounded to the metal hull or common ground, and all coverings such as pipe that may trap moisture must be provided with holes for drainage. Where cable protection is carried through a watertight deck or bulkhead, the installation must maintain the watertight integrity of the structure.

(c) Each cable entering a box or fitting must be protected from abrasion, and must meet the following requirements:

(1) Each opening through which conductors enter must be adequately closed.

(2) Cable armor must be secured to the box or fitting.

(3) In damp or wet locations, each cable entrance must be watertight.

(d) The enclosures of all equipment must be permanently grounded to the metal hull of the vessel by the mounting bolts or other means. Cable armor must not be used as the normal grounding means.

(e) On a nonmetallic vessel, the enclosures must be bonded to a common ground by a normal noncurrent carrying conductor.

(f) On a nonmetallic vessel, where a ground plate is provided for radio equipment it must be connected to the common ground.

(g) Except as provided in paragraph (i) of this section, each armored cable must have a metallic covering that is—

(1) Electrically and mechanically continuous; and

(2) Grounded at each end of the run to—

(i) The metal hull; or

(ii) The common ground required by paragraph (e) of this section on non-metallic vessels.

(h) In lieu of being grounded at each end of the run as required by paragraph (g) of this section, final sub-circuits may be grounded at the supply end only.

(i) All equipment, including switches, fuses, lampholders, etc., must be of a type designed for the proper potential and be so identified.

(j) Except as provided in paragraph (l) of this section, each junction box, connection box, and outlet box, must have an internal depth of at least 1½ inches.

(k) For a box incorporated in a fixture having a volume of not less than 20 cubic inches, the depth may be decreased to not less than 1 inch.

(l) Each conductor, except a fixture wire within a box, must have a free space computed using the volume per conductor given in Table 169.680(l). If a fitting or device such as a cable clamp, hickey, switch or receptacle is contained in the box, each fitting or device must count as one conductor.

TABLE 169.680(l)

Size of conductor A.W.G.	Free space for each conductor in box, cubic inches
14	2.0
12	2.25
8	2.50
1	3.0

(m) Each junction box, connection box, and outlet box for use in a damp or wet location must be of watertight construction.

(n) Each lighting fixture must be constructed in accordance with the requirements of Subchapter J of this chapter.

(o) A separate circuit from the switchboard must be provided for each radiotelephone installation.

(p) Knife switches must be so placed or designed that gravity or vibration will not tend to close them. Knife switches, unless of the double throw type, must be connected so that the blades are dead when the switch is in the open position.